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10/551,071

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EXAMINER

WANG, CHUN CHENG

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                        |  |
|------------------------------|--------------------------------------|----------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/551,071 | <b>Applicant(s)</b><br>SONEZAKI ET AL. |  |
|                              | <b>Examiner</b><br>Chun-Cheng Wang   | <b>Art Unit</b><br>1796                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 12, 13 and 23 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>03/05/2009</u> .                                              | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This office action is in response to the Amendment filed on 02/26/2009. Claim 23 are newly added. Claims 12-23 have been withdrawn from further consideration. Claims 1-11 are now pending.
2. The objections and rejections not addressed below are deemed withdrawn.
3. The text of those sections of Title 35, U.S. Code not included in this section can be found in a prior Office Action.

### ***Election/Restrictions***

4. Claims 14-22 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group II, process for producing surface modified TiO<sub>2</sub>, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 02/26/2009.
5. Newly submitted claims 12-13 and 23 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Group I, claims 12-13 and claim 23 do not contain common special technical features. Group I drawn to surface modified TiO<sub>2</sub>. Claim 12-13 were amended to method claims and claim 23 are added as a composition claim. Claim 1 is not novel (See Okabe (JP11255516A) and/or Perrin et al. (Preparation and properties of acrylic polymers/titania hybrid materials prepared by the in-situ sol-gel process, 10/2002 Society of Chemical Industry. Polymer International, 51: 1010-1022)). The expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior

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art. The prior art cited is evidence that the claimed inventions, considered as a whole, do not define a contribution over the prior art. Please see PCT Rule 13.2.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 12-13 have been withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Double Patenting***

6. Claims 1-8 and 10-11 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7, and 13-15 of copending Application No. 10551164.

The rejections stand as per the reasons set forth in the previous Office Action.

***Claim Rejections - 35 USC § 102***

7. Claims 1-2 and 5-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Okabe (JP11255516A), English translation is used as reference.

The rejections stand as per the reasons set forth in the previous Office Action.

8. Claims 1, 3 and 5-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Perrin et al. (Preparation and properties of acrylic polymers/titania hybrid materials prepared by the in-situ sol-gel process, 10/2002 Society of Chemical Industry. Polymer International, 51: 1010-1022).

Claims 1, 5-7: Perrin et al. disclose hybrid inorganic-organic materials based on a methyl methacrylate-co-n-butyl methacrylate-co-methacrylic acid terpolymer prepared by sol-gel

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process in the presence of tetrabutyltitanate. IR spectroscopic results show that COO-Ti bonds are formed (Abstract).

Claim 3: The average particle size is less than 400 nm (4<sup>th</sup> paragraph, page 1020).

Claim 8: The surface modified TiO<sub>2</sub> formed an aqueous homogeneous sol (Preparation of hybrid materials, page 1015).

***Claim Rejections - 35 USC § 103***

9. The disclosure of Okabe is adequately set forth in the previous Office Action and is incorporated herein by reference.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe (JP11255516A) in view of Huang et al. ("Bactericidal mode of titanium dioxide photocatalysis", Journal of Photochemistry and Photobiology A: Chemistry 130 (2000) 163–170).

The rejections stand as per the reasons set forth in the previous Office Action.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe (JP11255516A) in view of Watson et al. ("Synthesis of a Novel Magnetic Photocatalyst by Direct Deposition of Nanosized TiO<sub>2</sub> Crystals onto a Magnetic Core", Journal of Photochemistry and Photobiology A: Chemistry 148 (2002) 303-313).

The rejections stand as per the reasons set forth in the previous Office Action.

12. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe (JP11255516A) in view of Blake et al. ("Application of the Photocatalytic Chemistry of Titanium Dioxide to Disinfection and the Killing of Cancer Cells", Publisher: Taylor & Francis, Journal: Separation and Purification Methods, Volume 28 Issue 1, 1999, pp1-50).

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The rejections stand as per the reasons set forth in the previous Office Action.

13. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perrin et al. (Preparation and properties of acrylic polymers/titania hybrid materials prepared by the in-situ sol-gel process, 10/2002 Society of Chemical Industry. Polymer International, 51: 1010-1022) in view of Blake et al. ("Application of the Photocatalytic Chemistry of Titanium Dioxide to Disinfection and the Killing of Cancer Cells", Publisher: Taylor & Francis, Journal: Separation and Purification Methods, Volume 28 Issue 1, 1999, pp1-50).

The disclosure of Perrin et al. is adequately set forth in paragraph 8 and is incorporated herein by reference.

Perrin is silent on disperse the TiO<sub>2</sub> particles in pH buffered physiological saline.

Blake et al. disclose TiO<sub>2</sub> with HeLa cells (cervical carcinoma) were washed and mixed with phosphate buffered saline (PBS), reads on pH in the range of 3 to 13, containing SOD (superoxide dismutase). The mixture was irradiated with a 500 W high pressure mercury lamp filtered to transmit 300-400 nm light, reads on UV light. **Tumors** caused by transplanting HeLa cells into nude mice were **suppressed by irradiation with 300-400 nm light in the presence of TiO<sub>2</sub>** (page 28, Tumor Cells), which reads on a phototherapy for treatment of cancer tumor.

The surface treated TiO<sub>2</sub> in buffered saline solution suppress tumors by irradiation of UV light. In light of such benefit, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to utilize the **surface treated TiO<sub>2</sub> having extremely high catalytic activity per unit area** and suggestions from Blake et al. to make buffered saline solution of the surface treated TiO<sub>2</sub> and use it for phototherapy treatment of cancer tissue.

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***Response to Arguments***

14. Applicant's arguments with respect to references Sakamoto et al. (US5049309) and Robb (US5068056) have been considered but are moot in view of the new ground(s) of rejection.

15. Applicant's arguments filed 02/26/2009 have been fully considered but they are not persuasive.

16. Regarding reference Okabe (JP11255516A):

Applicants alleged: “the solution before the spraying thermal degrading is a solution of an organic metal compound complex intermediate, not a TiO<sub>2</sub> powder as claimed” and “intermediate complex does not comprise TiO<sub>2</sub>” (page 11, 1<sup>st</sup> paragraph).

Response: Attention is drawn to instant Claim 1, which claims “Surface modified titanium dioxide fine particles”. The particles could be in many different forms or shapes other than powder. The attention is also drawn to Okabe disclose “solution of the composite carboxylic ester complex oligomer” (Abstract).

***Conclusion***

17. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 03/05/2009 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chun-Cheng Wang whose telephone number is (571)270-5459. The examiner can normally be reached on Monday to Friday w/alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ling-Siu Choi/  
Primary Examiner, Art Unit 1796

/Chun-Cheng Wang/  
Examiner, Art Unit 1796

/CCW/